Response to Amendment

Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Terminal Disclaimer

The terminal disclaimer filed on October 14, 2009 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of any patent granted on pending Application Number 10/555,853 has been reviewed and is accepted. The terminal disclaimer has been recorded.

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Andrew L. Tiajoloff (Reg. No. 31,575) on October 29, 2009.

The application has been amended as follows:

In Claim 1, line 5 dated October 14, 2009 replace the term "made" with the term "consisting".

Response to Arguments

Responsive to the Official Action dated June 8, 2009, Applicant presented arguments in a personal interview on October 6, 2009 (see Interview Summary dated October 8, 2009) as well as supplemental evidentiary references in the Amendment After Final dated October 14, 2009.

With respect to the rejection of claims 1-4 under 35 U.S.C. §103(a) over Fabian '131 in view of Hellmann '489, Applicant asserted in the personal interview that the Hellman apparatus is employed for use as a vapor deposition chamber which is unrelated to the crucible for producing a silicon boule from a silicon melt as disclosed in the Fabian reference. Although Applicant acknowledged that Hellman teaches that naturally occurring quartz may be used on the inner surface lining of a vapor deposition chamber, Applicant argued that the material considerations are much different for the inner surface of a silicon melt crucible (see page 6 of Applicants Reply dated April 3, 2009). Applicant concluded that, although both references teach quartz structures, one of ordinary skill in the art would not look to the Hellmann reference in order to modify the Fabian device.

The instant argument was deemed persuasive by the Examiner and the rejection of claims 1-4 under 35 U.S.C. §103(a) over Fabian '131 in view of Hellmann '489 is hereby withdrawn.

With respect to the rejection of claims 1-4 over Nakajima '473 in view of Matsumura '801, Applicant acknowledges that **Nakajima** teaches a quartz crucible with

an inner lining comprising an opaque upper layer having a high bubble count and a transparent lower layer having a low bubble count. Applicant further notes that **Nakajima** is silent regarding the use of either synthetic or natural quartz materials as recited in pending claim 1 of the Application.

Applicant further acknowledges that **Matsumura** teaches a high bubble content, opaque layer fabricated from natural quartz and a low bubble content, transparent layer fabricated from synthetic quartz.

Applicant finally acknowledges the Official position that 1) it would have been obvious to replace the transparent quartz layer of **Nakajima** with the transparent synthetic quartz layer of **Matsumura** and 2) to replace the opaque quartz layer of **Nakajima** with the opaque natural quartz layer of **Matsumura.**

In response, Applicant asserts that the Official position is "based on the premise that synthetic glass is per se transparent and natural quartz is not". With respect to the combination of references as set forth in the prior Official Action, Applicant asserts;

1) that in the manufacture of quartz crucibles, the terms "natural quartz" and "synthetic quartz" constitute art recognized terms directed to distinct materials, and

2) that natural quartz may be employed to fabricate either a high bubble content layer as shown in Matsumura or a low bubble content layer dependent upon the heat treatment used to fabricate the crucible (see page 7, Applicants reply dated April 3, 2009)

In support of point (1) above, Applicant presented (see Amendment After Final Dated October 14, 2009) the reference to Geittner et. al. which compares natural and synthetic silica glass products.

While the instant reference is not deemed persuasive with respect to an art recognized distinction between synthetic and natural quartz in the field of quartz crucible manufacture, upon further investigation the Examiner has discovered a plurality of prior art references which support the Applicants stated position. Regarding the art recognized distinction between synthetic and natural quartz, see for example Albrecht (US 4,528,163; abstract, col. 1, line63-col. 2, line27), Lang (US 4,572,729; col. 1, line10-43), Shimizu (US 5,141,786; col.1, line 60-col.2, line 2, col. 2, line50-col.3, line 6). Additional references to Wantanabe (US 6,280,522), Fabian (US 6,548,131), and Sato (US 6,797,061) provide further support for an art recognized distinction between natural and synthetic variants of quartz for the production of quartz crucibles.

In view of the foregoing, it is the Examiners conclusion that the termed “natural quartz” and “synthetic quartz” materials are recognized in the art of quartz crucible manufacture as distinct materials.

In support of point (2) above, Applicant presents references to Bruckner and Geitner which Applicant alleges show that naturally occurring quartz may be employed to the manufacture of “transparent” bodies. Applicants references have been fully considered, however absent a comparison with translucent or opaque bodies of the same manufacture, the instant references are not deemed persuasive. That is, the

bubble content of the disclosed glass bodies is nowhere discussed, and Applicants conclusions do not appear to be supported by the evidence on record.

Having acknowledged the foregoing, the reference to Sato et. al. (US 5,989,021) is directed to the fabrication of quartz glass crucibles comprising natural quartz inner layers. With respect to the formation of the inner layer of the crucible, Sato states that a "second natural quartz powder...was fed into the high temperature gas atmosphere in the inside space of the substrate (3) … A time period of the heating for formation of a transparent silica glass inner layer (4) was one hour" (See Example 1, Col.6, lines 10-54). In view of the Sato disclosure, it is evident that natural quartz materials may be employed to the manufacture of transparent inner linings of quartz crucibles.

In view of Sato, Applicants stated position, namely that natural quartz may be used to fabricate either opaque or transparent layers in quartz crucibles and that one of ordinary skill in the art would not necessarily seek to use natural quartz to the manufacture of the opaque layer of Nakajima or synthetic quartz to the manufacture of the transparent layer of Nakajima, is deemed persuasive. For the foregoing reasons, the rejection of claims 1-4 over Nakajima '473 in view of Matsumura '801 is withdrawn.

Allowable Subject Matter

Claims 1-4 as amended in Applicants amendment After Final dated October 14, 2009 and as further amended by Examiners Amendment above are allowed.

The following is an examiner's statement of reasons for allowance:

The reference to Nakajima (US 5,306,473) teaches a quartz crucible comprising an opaque inner lining on the approximately the upper 25% of the crucibles inner layer and the remaining inner layer from the base up to the opaque layer as a transparent, low bubble content layer. Nakajima is silent regarding the use of natural or synthetic quartz to the manufacture of the disclosed quartz crucible.

The reference to Nakajima (US 5,306,388) teaches a quartz glass crucible for pulling a single crystal which comprises an opaque area within the 75% of the crucible height and a lower transparent portion. Nakajima is silent regarding the use of natural or synthetic quartz to the manufacture of the disclosed quartz crucible.

The reference to Sato (US 5,989,021) teaches (col. 6, lines 10-54) that natural quartz may be employed to manufacture the inner lining of a quartz crucible.

The reference to Omaha (US 7,299,658) teaches (col. 3, lines 14-54) that a mixture of natural and synthetic natural quartz glass may be employed to manufacture an intermediate layer on the inner surface of a quartz glass crucible.

The reference to Omaha (US 6,886,364) teaches (col. 3, line 64 to col. 4, line 12) that a mixture of natural and synthetic quartz may be employed to the manufacture of the outer layer and/or inner liner of a quartz crucible.

Sato teaches a natural quartz inner layer, the references to Omaha teach mixed natural and synthetic quartz inner layers, and a plurality of other references of record teach the use of synthetic quartz inner layer. No reference taken alone or in

combination teaches the structured inner layer as recited in Applicants amended claim 1.

None of the above noted references teach nor fairly suggest the invention of claim 1 as amended by the Amendment After Final dated October 14, 2009 and by the Examiners Amendment as presented above. Specifically, no reference teaches a quartz glass crucible wherein the inner layer of the crucible comprises

1) a first part consisting of a synthetic quartz extending from the bottom part to a height of at least 0.25 H,

2) a second part made of a naturally occurring quartz glass or made of mixed quartz glass of naturally occurring and synthetic quartz glass, and extending in at least a range of from 0.5 H to 0.8H; and

3) a residual part made of quartz glass selected from the group consisting of synthetic 2quartz glass, naturally occurring quartz glass, and mixed quartz glass of naturally occurring and synthetic quartz glass.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JASON L. LAZORCIK whose telephone number is (571)272-2217. The examiner can normally be reached on Monday through Friday 8:30 am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on (571) 272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jason L Lazorcik/
Primary Examiner, Art Unit 1791